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**Annealed linear high density polyethylene and preparation thereof**

**Description of Technology:** This invention relates to an annealed linear, high density polyethylene (LHDPE), and particularly to the preparation of tough, impact resistant articles therefrom. Linear, high density polyethylene (LHDPE) in a "medium" molecular weight range of about 30,000 to about 300,000 (melt index range of about 300 to about 0.01), prepared by low-pressure polymerization of ethylene in the presence of coordination-type catalysts, is a well known, widely used commercial polymer. LHDPE is characterized by having virtually no long-chain branching, short-chain (methyl) branching of less than about 5 CH.sub.3 groups per 1000 carbon atoms, and a density of at least 0.94 g/cm.sup.3. Highly linear LHDPE has a density of at least about 0.96 g/cm.sup.3. It is also well known that LHDPE is crystalline and, after conventional melt-processing, exhibits folded chain crystalline morphology and a melting point in the range of about 128.degree.-137.degree. C. The literature reports many attempts to change the morphology of LHDPE to a more extended chain form by recrystallization at high pressures, resulting in generally higher melting, more crystalline and brittle products. The preparation and properties of these so-called extended chain products have been extensively reviewed; see, for example, Lupron et al. J. Appl. Poly. Sci., 18, 2407 (1974); Geil et al. J. Poly. Sci: A, 2, 3707 (1964).

**Patent Listing:**

1. **US Patent No. 5,382,643,** Issued on January 17, 1995, "Annealed linear high density polyethylene and preparation thereof"

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=5382643.PN.&OS=PN/5382643&RS=PN/5382643

**Market Potential**: The products of this invention are especially useful in load-bearing applications such as seals, bushings, bearings, prosthetic devices and the like where non-annealed LHDPE as well as other polymers are currently used. Articles processed according to this invention have strength properties approaching those of ultrahigh molecular weight polyethylene (UHMWPE), yet the starting polyethylene is of low molecular weight (relative to UHMWPE) and can easily be formed or fabricated by, for example, injection molding; UHMWPE is not injection moldable because of its essentially infinite melt viscosity which results in void formation and loss of properties during fabrication.

**Benefits:**

- Strength properties approaching those of ultrahigh molecular weight polyethylene, such as UHMWPE.
- Starting polyethylene is of lower molecular weight than UHMWPE.
- Can easily be formed or fabricated by injection molding where as UHMWPE can not.

**Applications:**

- Products of invention can be used in load-bearing applications.

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